

[H2PIA]

'World's first hydrogen City'

What?

‘H2PIA is a concept about the future intelligent, interactive and hydrogen based energy society constructed as a small scale demonstration city.’

Purpose?

‘The aim is to demonstrate and communicate how to secure a stable and constant supply of clean renewable energy represented through attractive innovative energetic architecture and pollution-free transportation.’

How?

'Simpel and Beatiful'

The 4 Legs

New Architecture
New Energy technologies
New Transportation
and
Communication

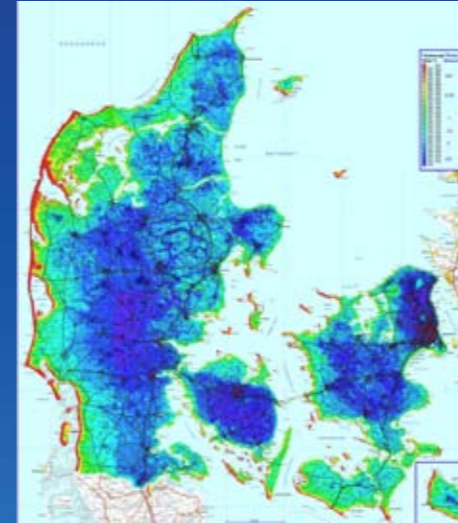
The H2PIA Idea

In 2005 the initial ideas about a hydrogen based city - the world's first ever - took place. Overproduction, and very low export prices for electricity during periods of peak performances from the 20% wind power in Denmark has for many years been an occasion for research and development of energy storage facilities.

Compared to a series of storage solutions in Denmark, the hydrogen technologies with electrolysis, storage of hydrogen and fuel cells are now considered a very promising scenario in the long term. Also it fits very well together with the Danish Government prospect of 50% supply of windpower in Denmark from year 2025

To demonstrate how to secure such a stable and constant supply of clean renewable energy in the future CO₂-neutral and pollution-free society - based on interactive energy systems and hydrogen technologies in the building and transport sector - the H2PIA team developed the concept of H2PIA CITY.

To ensure the realization of the project several Danish political parties have declared H2PIA a future necessity and announced their support to the construction of the city.



Energy Solutions

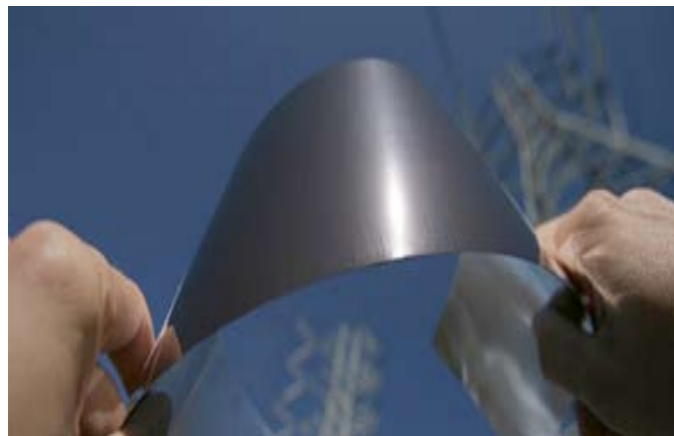
- Solutions for decreasing the energy consumption in buildings
 - Solar energy for heat and electricity
 - Wind Power
 - Electric based Vehicles
 - Hydrogen Technologies in buildings and Vehicles
- Intelligent and Interactive energy network between central and decentralized energy production

Small wind turbines

During recent years a new generation of small wind turbines for households have appeared at the market. They are at the same time silent and elegant.

In Denmark the Government Department of Energy and Climate has announced a tax policy change giving wind turbines the same economic conditions as solar cells when delivering reserves of electricity at the common grid. Some of the small turbines can supply the entire annually consumption of electricity for a typical household in Denmark.





Solar Energy

In new buildings we gradually see very well integrated solutions by the use of solar energy.

Within the area of solar cells an outstanding development has taken place during the last decade. New types of solar-cells have reached the market that can substitute materials for a range of different building elements for roofing, facades, solar screening, integrated in large glass units and alike.

All applications for solar energy set new demands for the architectural designing and aesthetics, but offer at the same time great possibilities for innovative thinking.

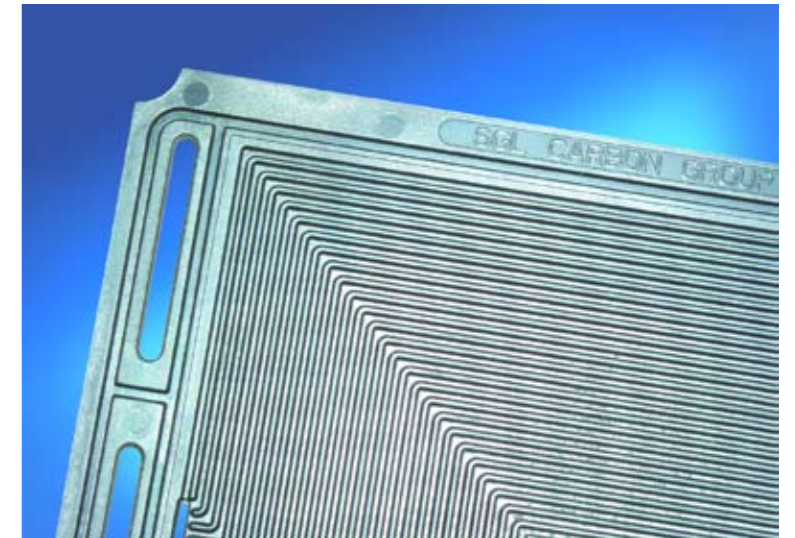


Hydrogen Technology

ELECTROLYSIS, HYDROGEN STORAGE AND FUEL CELLS

The hydrogen technologies are very promising both as storage facility and combined power and heating stations. A lot of Danish companies work intensively with the implementation of fuel cells both for the building and transport sector; but also with development of large hydrogen-based energy storage capacities for energy grids.

The number of companies and research institutions involved with this work are many; but the situation of today is that investments primarily are placed in countries like Japan, China, Germany, USA and Canada. The people involved in this work all are very certain, however, that future energy supplies will be hydrogen-based. They even talk in terms like “the hydrogen race”.



Energetic Architecture

The Energy Link

The connection between solar cells, wind energy, hydrogen technology and buildings is obvious to many. And with an increasing understanding of the architectural potentials with renewable energy, architects contribute to changing the way of thinking when designing energy optimized buildings.

With the newest technology our buildings are actually capable of operating like huge decentralized batteries, with the power to produce energy and connected to the utility grid selling and buying energy when necessary. Furthermore the energy use in concern to transport and building operation can be united because our vehicles and houses will be able to transfer energy back and forth between them.

Depending of the functions for the building, choice of energy solution and the location for the building compared to the local energy infrastructure we will most likely see a more differentiated architecture in the future.

The H2pia Architecture

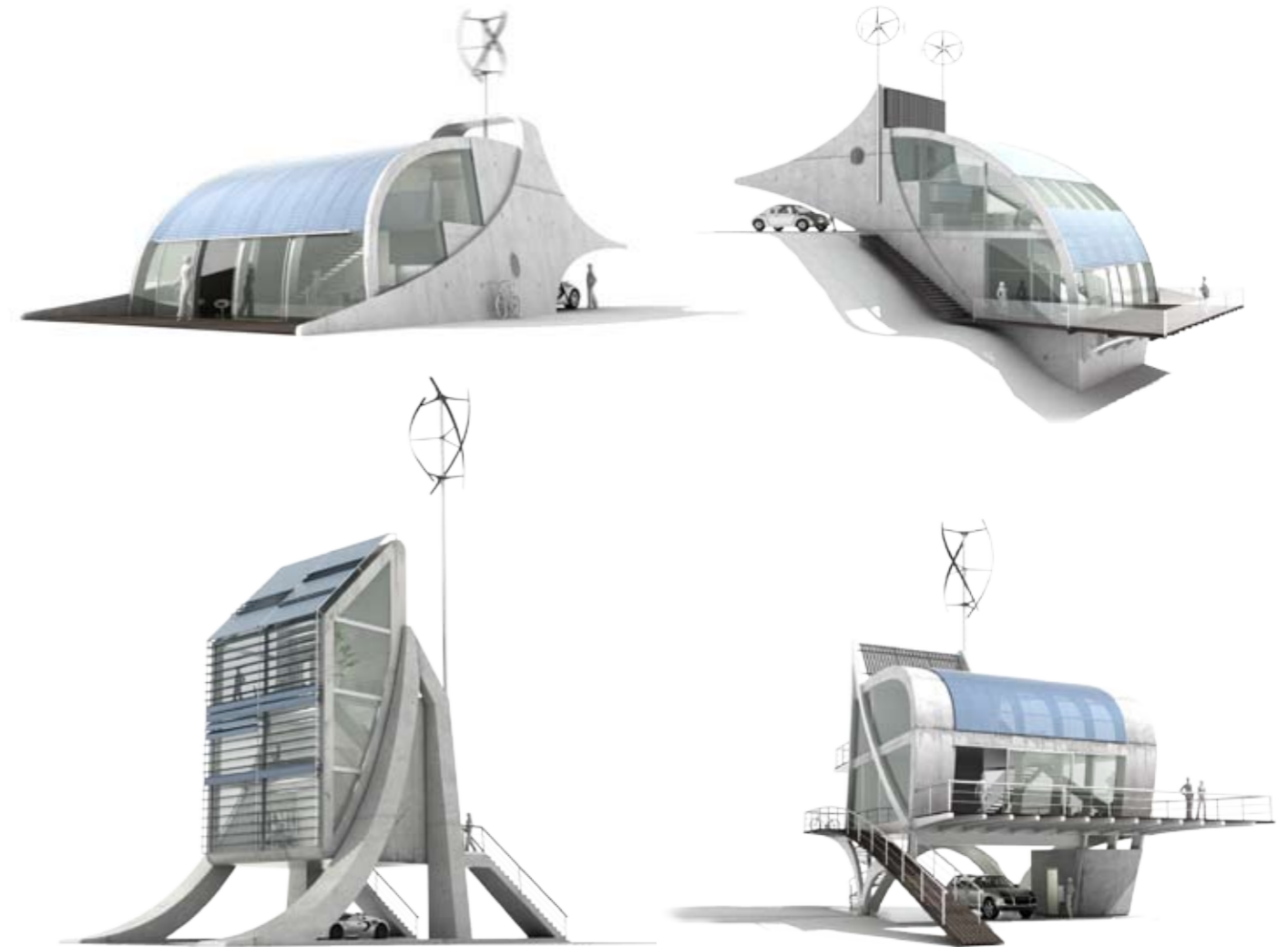
The ambitions of the H2PIA architects have been to illustrate the architectural benefits from implementing renewable energy and hydrogen technologies through innovative energetic architecture.

It has been the mission to challenge existing beliefs and visualising a future with renewable energy systems as an integrated and harmonic part of the building environment.

The objective has been to build bridges between beauty and energy technology in the architecture - to ensure visual appeal and practical end-user benefits.

The beauty of the technology lies in the possibilities of generating heat and electricity directly from the natural, unlimited, environmental friendly energy sources of sun, wind and water. The philosophy is, however, that doing good never should be at the cost of looking good.

The goal of the architects has been to create an icon for hydrogen powered buildings, incorporated into a set of modern and aesthetic housing designs.



H₂PIA FUEL-STATION

The H₂PIA Fuel-Station is an architectural vision from where the future electric/fuel cell car can be recharged with electric power or filled with hydrogen. The station will get the hydrogen from electrolysis using reserves of electricity from windmills; splitting water into hydrogen and oxygen.

The hydrogen will be needful for longer drives when the battery cannot supply enough electricity. The fuel-cells in the car will continuously and very efficiently produce electricity from the hydrogen with water as only waste product.

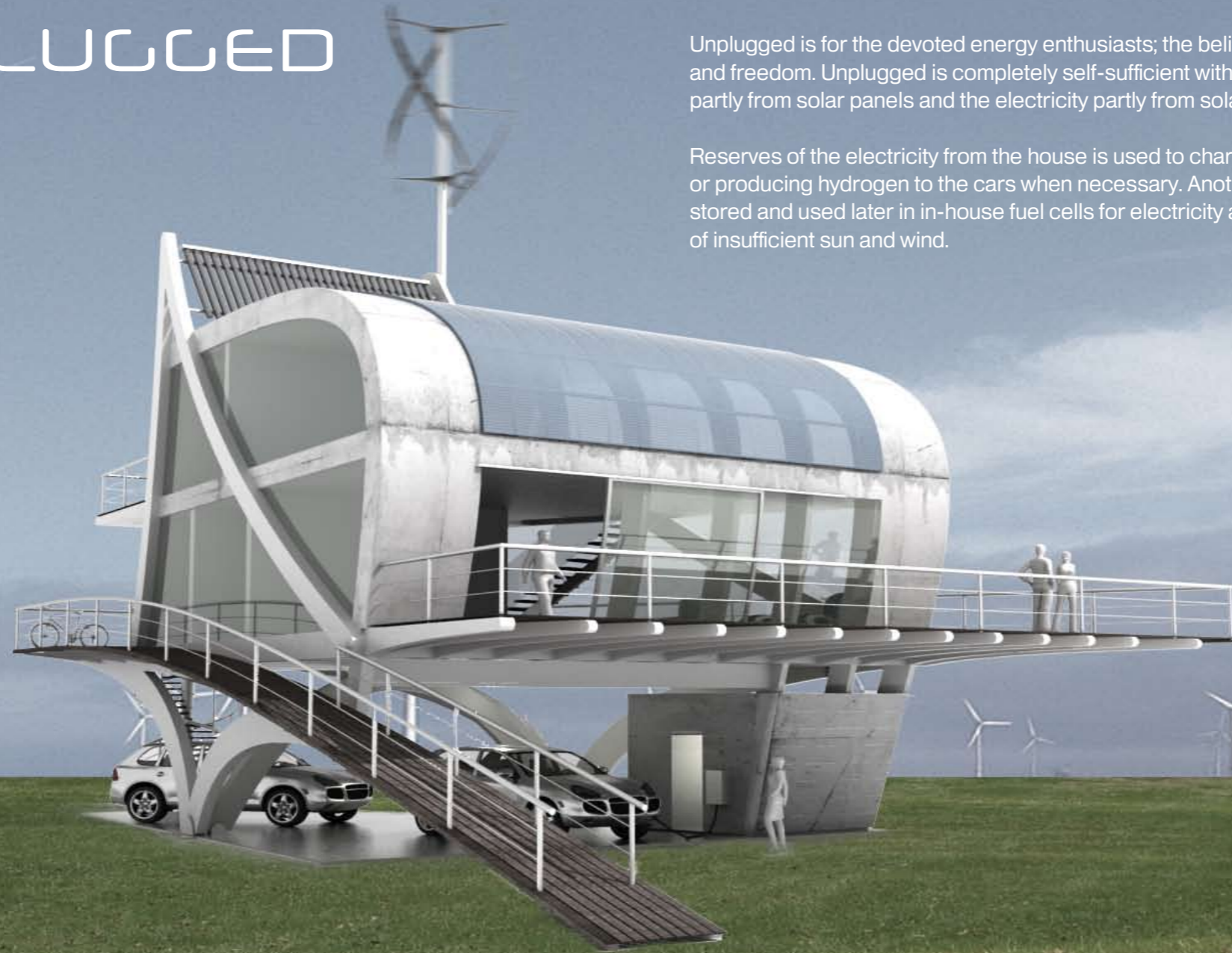


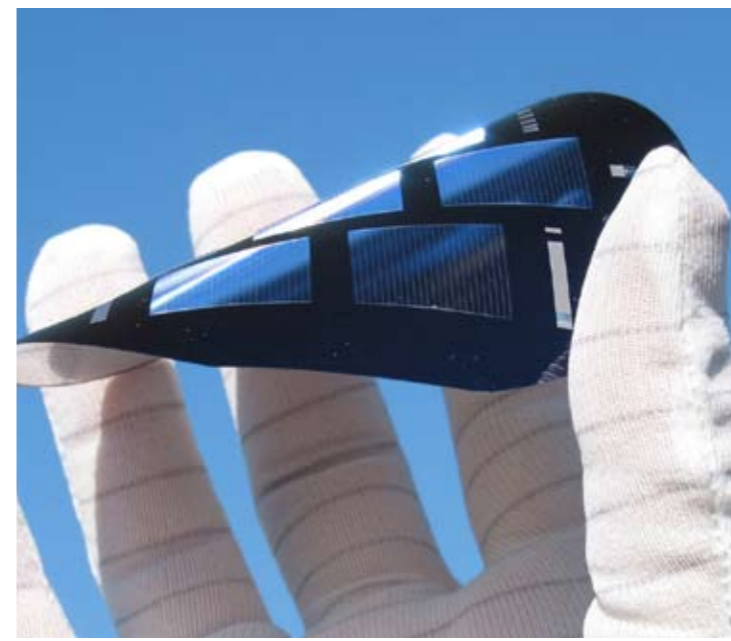


H2PIA UNPLUGGED

Unplugged is for the devoted energy enthusiasts; the believers who also crave space and freedom. Unplugged is completely self-sufficient with energy. The heat comes partly from solar panels and the electricity partly from solar cells and wind turbine.

Reserves of the electricity from the house is used to charge the batteries in the cars or producing hydrogen to the cars when necessary. Another part of the hydrogen is stored and used later in in-house fuel cells for electricity and heating during periods of insufficient sun and wind.

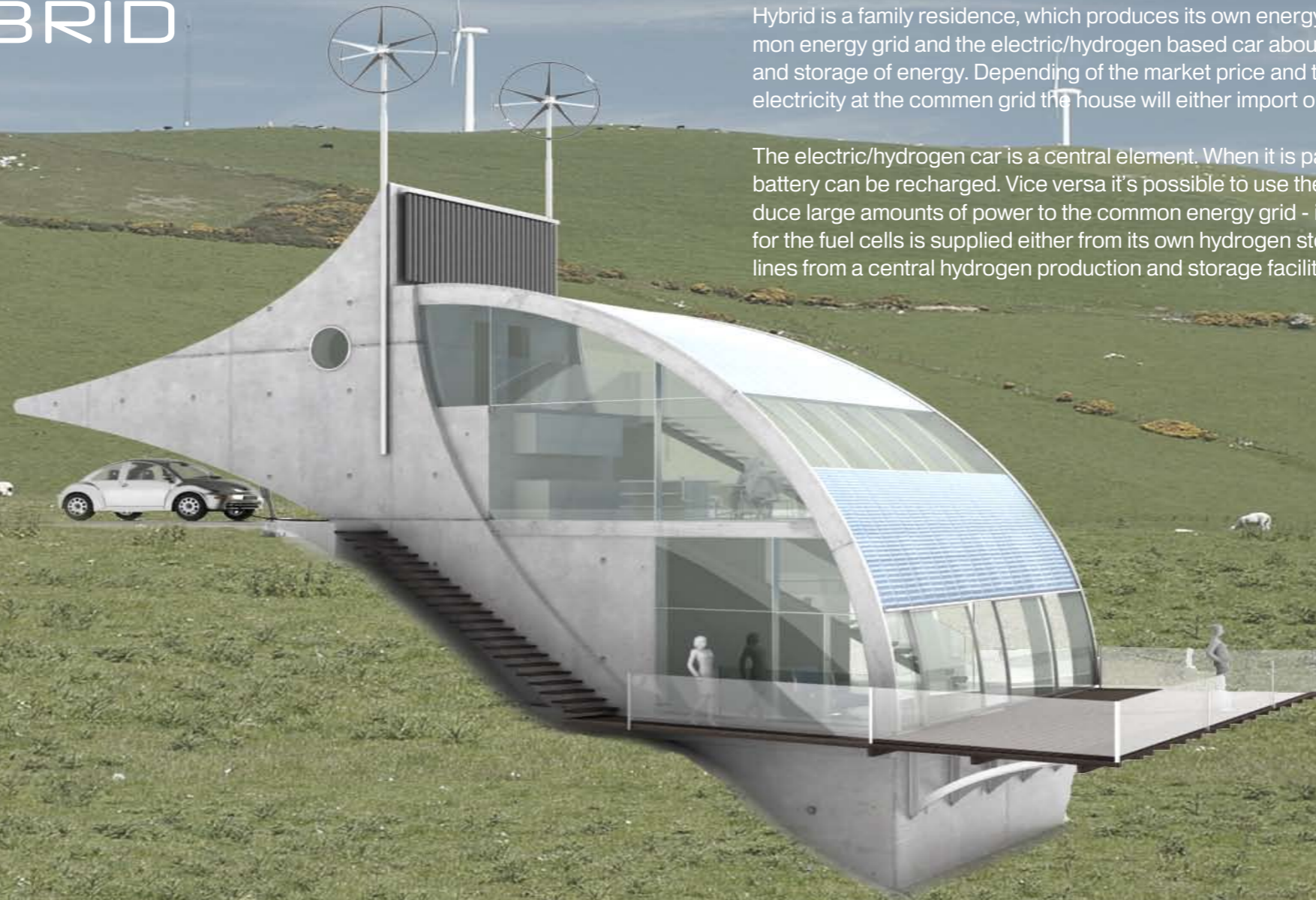


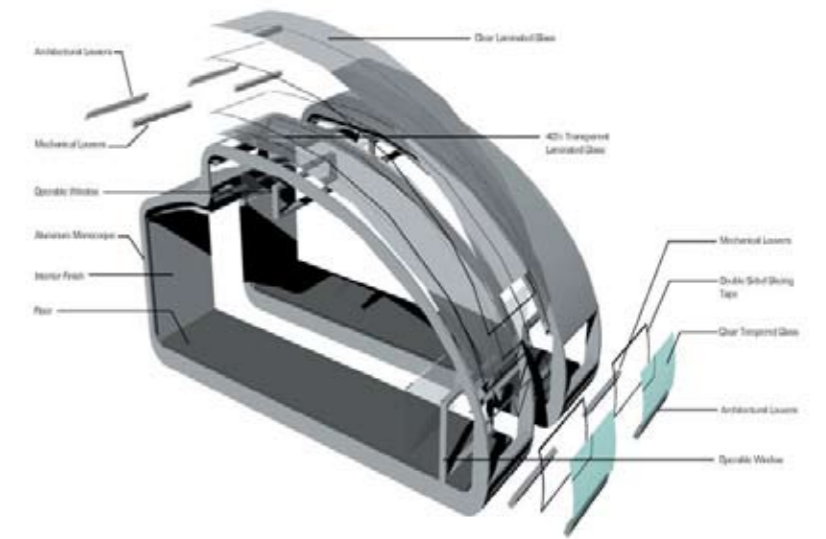
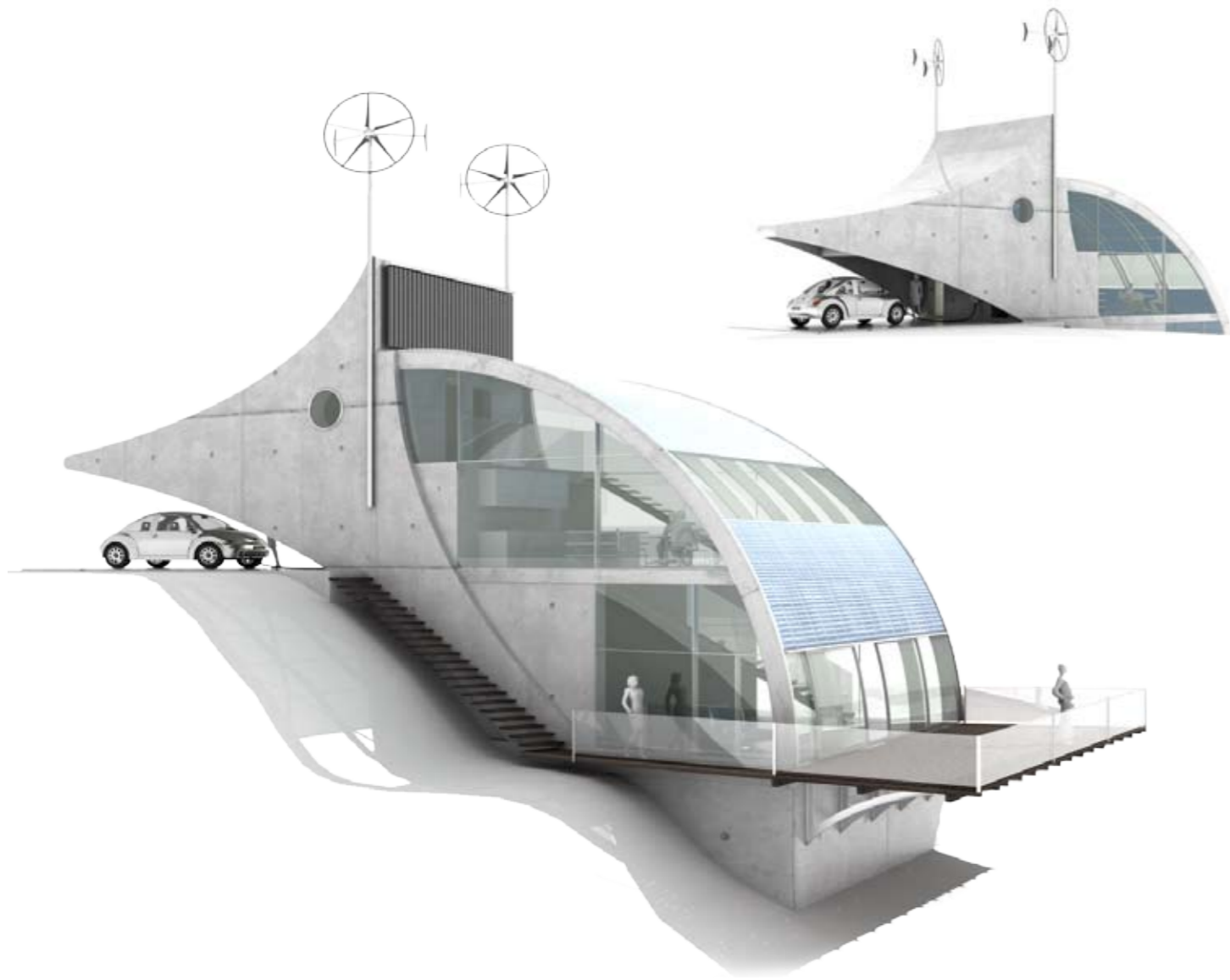


H2PIA HYBRID

Hybrid is a family residence, which produces its own energy in interaction with the common energy grid and the electric/hydrogen based car about production, consumption and storage of energy. Depending of the market price and the reserves or shortage of electricity at the common grid the house will either import or export energy.

The electric/hydrogen car is a central element. When it is parked next to the house the battery can be recharged. Vice versa it's possible to use the on-board fuel cell to produce large amounts of power to the common energy grid - if necessary. The hydrogen for the fuel cells is supplied either from its own hydrogen storage tank or through pipelines from a central hydrogen production and storage facility.



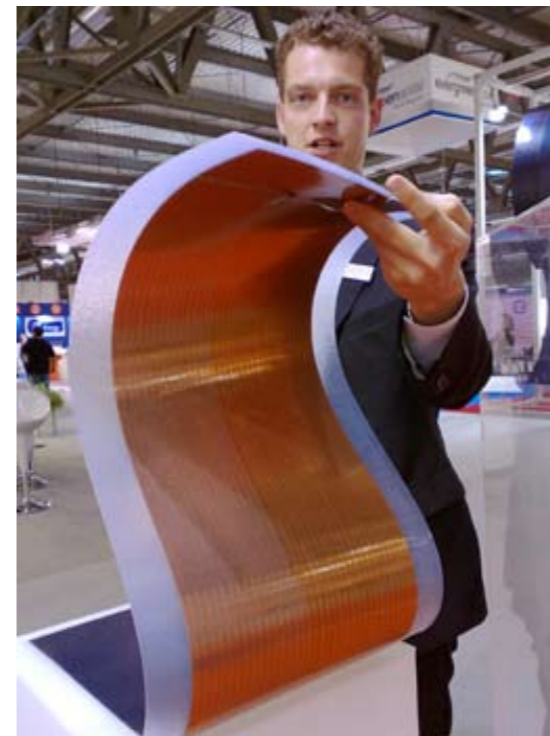
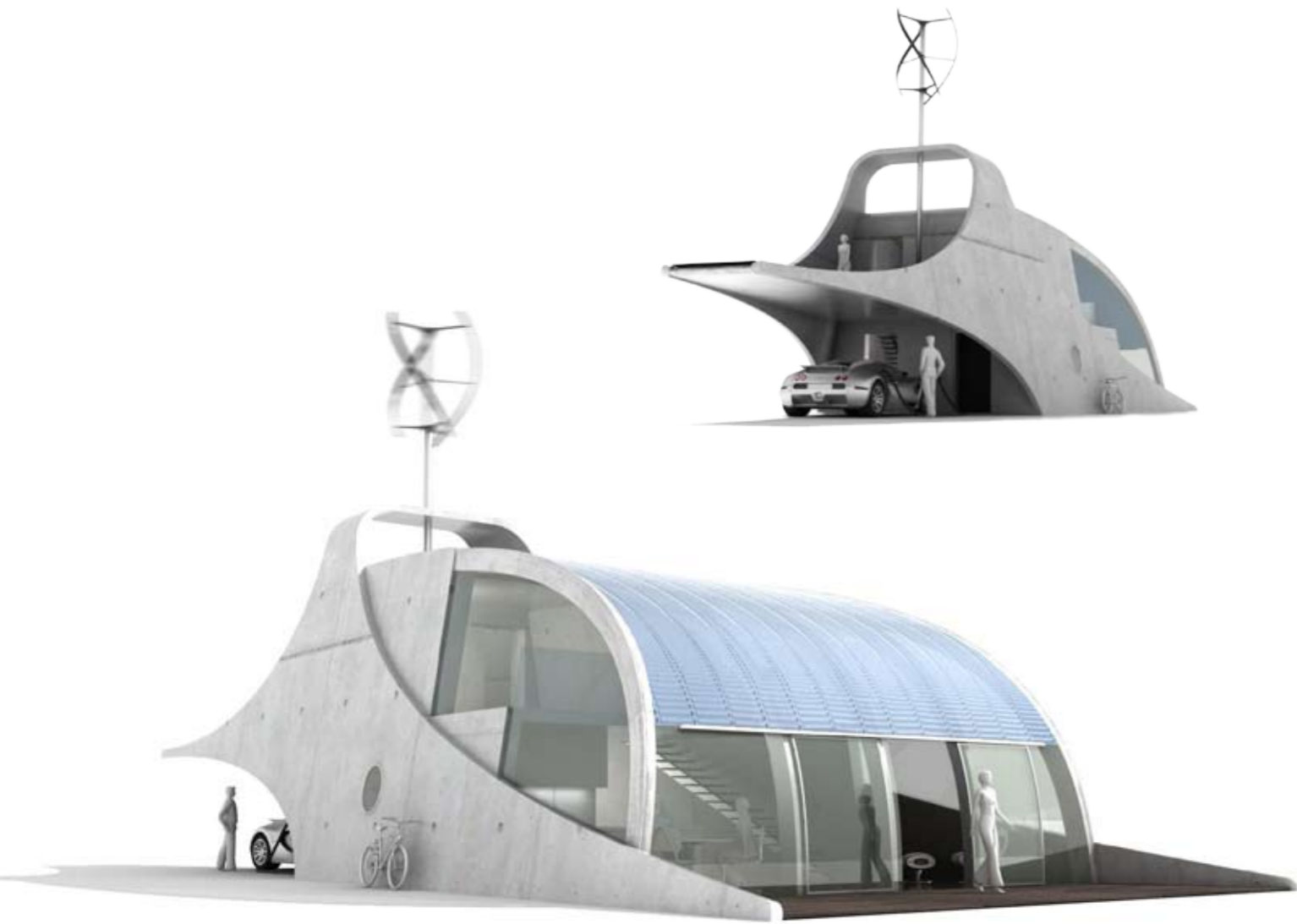


H2PIA PRODUCER

Producer is a residence designed for the young couple who want to live a modern life; self-sufficient with renewable energy for the housing and transport.

Most of the south facade is a partial transparent double facade with solar-cells and high insulated glass units. The outer concrete structure raises up and embrace the wind turbine, afterwards moving at the back forming the garage roof for the car.





H2OFFICE

H2Office is an architectural vision for the integration of solar cells, fuel cells, windpower and electric cars in a small and lively office building. By the use of hydrogen in fuel cells the office building is supplied with heat, hot water and electricity. Below the building electric cars can be recharged.





H2PIA ENERGY SYSTEM

